LUBRICATION

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We invite correspondence from all those interested.

Those who fail to receive LUBRICATION promptly, will please notify us at once and will confer a favor by promptly reporting change of address.

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In the article on the Southwark-Harris Engine, we have a valuable addition to our series of Diesel and Oil Engines as described by their manufacturers. We believe that you will be especially interested in the accurate performance figures.

Apropos to the installation on ships described in the above-mentioned article:

Recently the "Panama," a Diesel Engined vessel, capable of carrying over 9,000 tons, took on a load of case oil at The Texas Company's plant, Port Arthur, Texas. This shipment of 2,300,000 gallons was destined for China, direct through the Panama Canal, and was the largest single shipment of case oil we ever made.

It is also interesting to note that her supply of oil fuel will carry her 30,000 miles, a cruising radius worthy of great consideration by all ship builders and owners. The fuel consumption runs to 11 tons of oil in 24 hours at 12 knots an hour —she would have to burn 48 tons of coal to accomplish the same results.

Another point worth remembering—Texaco Ursa Oil is the last word for Diesel Engine lubrication.

"I'll Ask Smith"

"Smith has been running an engine like mine for four years—I'll ask him what cylinder oil he is using."

Good—provided there is a Smith near you—and provided he has the right information.

But how much better it would be to get the experience of thousands of Smiths—the experience of an Organization which has encountered in its daily work, more kinds of engines, and under more varied conditions than the average engineer can see in years.

Such an Organization is behind TEXACO LUBRICANTS.

Our representatives are in power plants, in shops, from "the icy hills to the palm trees," installing, observing, and testing lubricants for all purposes, and under all kinds of mechanical conditions.

They go into steel mills, into ice factories, into cotton mills, and coal mines—everywhere.

The knowledge of oils and their correct application, coupled with the recognized high quality of TEXACO LUBRICANTS, enable us to go into any plant and provide the right lubricant for any purpose where an oil is required.

We are taking over the entire lubricating problem for engineers all over this country, and we have every assurance of being able to solve yours, and show you actual results in the reduction of frictional loss, and in the saving on lubricating costs.

Get in touch with us, and let one of our representatives tell you which of the TEXACO LUBRICANTS you need for YOUR working conditions.

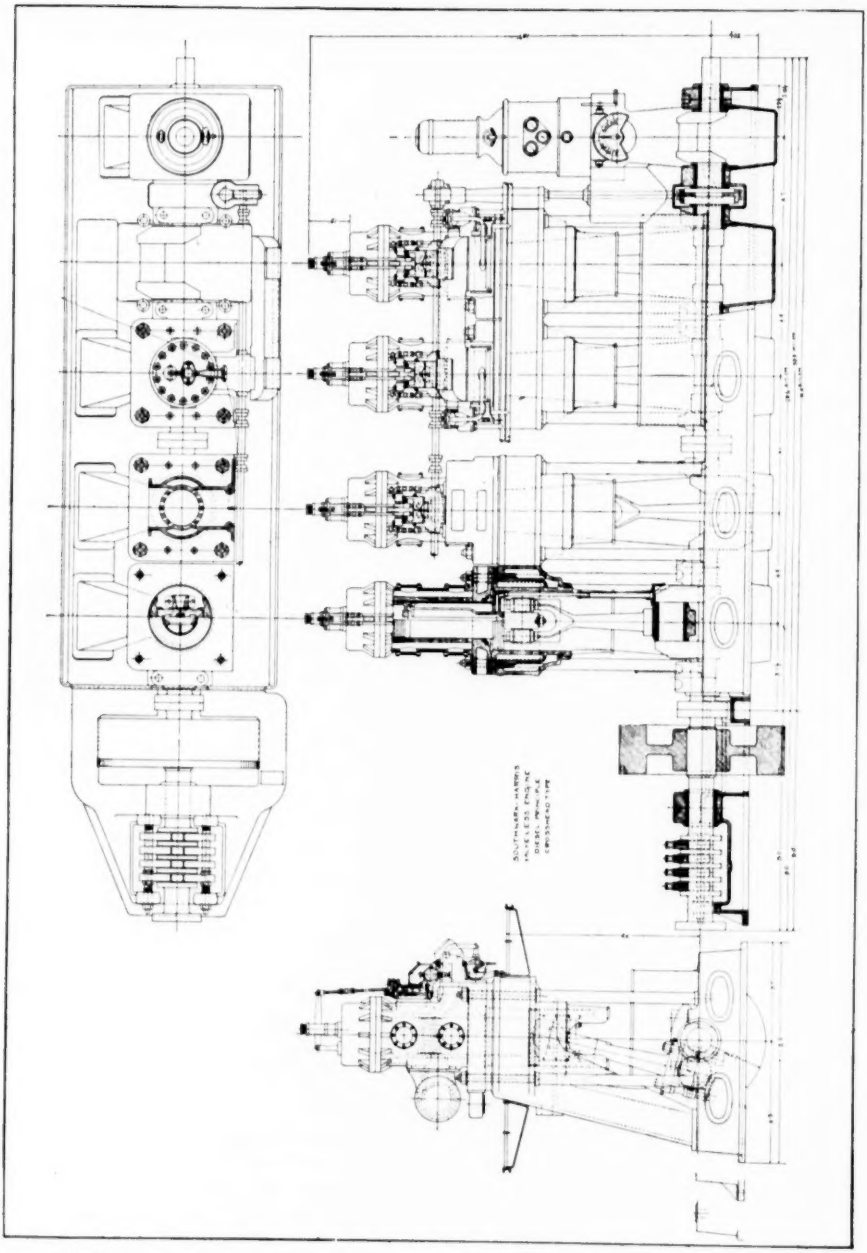

Diagram of the Southwark-Harris Valveless Engine, Diesel Principle

THE SOUTHWARK-HARRIS DIESEL ENGINE

The Southwark-Harris Valveless Engine, Diesel principle, is a vertical, multi-cylinder, two-cycle engine of the step piston type. The engine embodies in its design the best features of marine steam engine practice. Some of the distinguishing features of the Southwark-Harris engine are as follows:

Instead of admitting cold, high pressure air into the working cylinder to start up or reverse, the step pistons are, by novel arrangement, converted into air motors and operated with low pressure air. In starting up the engine, air is at first admitted into the step cylinders, which are enlarged cylinders below the working cylinders, and which are alternately air motors and scavenging pumps without either function interfering with the other. This air starting on the step piston enables the engine to be designed only for its working pressures, approximately 500 pounds, instead of for 1,000 pounds pressure. The one great advantage, however, of the air starting on the step piston is the fact that cold, high pressure air is never admitted into the hot working cylinder, a most prolific cause of cracked cylinder heads and pistons.

The Southwark-Harris Valveless Engine, having port inlet and port exhaust and air starting on the step piston, does not have any valves in its cylinder heads, there being only one small opening in each for the atomizer, and consequently the cylinder head is a very simple casting and much of the trouble of ordinary Diesel engines is obviated.

The Southwark-Harris Valveless Engine, by using the step piston, avoids the common difficulties of excessive clearance of the piston, and the wrist pin is comparatively cool in the step or lower piston which practically does not expand. There can therefore be a nice fit in the lower cylinder, and this acts as a circular crosshead guide for the main piston. In the larger sizes, an adjustable marine type of crosshead is combined with and forms a part of the step piston. The main pistons can have ample clearance between themselves and the walls of the cylinders and "let the rings do the work they are there for."

Another advantage of these step pistons acting as scavenging pumps is that they draw in upon themselves and around the working piston on its outgoing stroke a charge of atmospheric air for scavenging purposes. This air helps to cool the working pistons, and the air itself at the same time is thus slightly heated. It is therefore apparent that when this scavenging air enters the working cylinders it is never cold.

The Southwark-Harris Valveless Engine, governs on a special variable stroke pump controlled by the governor. Once the line is cleared of air, there is always a solid stream of oil from the service tank to the atomizers, and the slightest movement of the pump plunger produces a corresponding movement in the column of oil.

The oil is delivered from the service tank to the pumps under air pressure taken care of by the engine, which may be anything from five pounds to one hundred pounds, making it immaterialwhere the service tank is located.

The Southwark-Harris Engine can stand idle for weeks at a time

and be started in a few seconds without hand pumping, owing to the method in use in its pumping and atomizer arrangements.

The Southwark-Harris Engine is able to start under load like a steam engine. In starting or reversing the Southwark-Harris Engine, the action is similar to starting up a steam engine with an air pressure of from 175 pounds to, say 300 pounds. This air, when allowed to act on the step pistons, will turn the engine over even with a load on so long as the engineer desires to do so, and after the momentum of the engine is built up, the oil can be given to the main cylinders, the air still being allowed to act on the step pistons. This will augment the power being developed from the main pistons, and if the engineer desires it, both the main and step pistons can be acting at the same time, the former on oil and the latter on air. This feature alone is a distinctive advantage in the application of the Southwark-Harris Valveless Engine, and it enables the ship to respond more quickly and with more certainty in the case of reversing from full speed ahead to full astern or vice versa. The Southwark-Harris Engine has been changed from full speed ahead to full astern in two and one-half seconds, and from slow ahead to slow astern in less than five seconds.

The reversing of the Southwark-Harris Engine is done by moving one rod on each cylinder which could be done by the little finger, no matter how large the engine might be. No power is required except that which can be exerted by hand, regardless of the size of the engine. The same wheel or lever which admits the starting air and the fuel oil controls the movement of these rods. This does away with a lot of small air valves and by-pass valves, levers and extra shafting, and the loose feathers in the camshaft, and the danger of this important member shifting from its exact setting.

The Southwark-Harris Engine has been designated by eminent engineers as "The Simplified Diesel." Having the entire control centralized in one hand wheel, having only one cam to each cylinder operating, and having only one opening in the cylinder head, that being for the atomizer, the designation seems to be appropriate. It is not necessary to open or close any air or oil valves while changing from full ahead to full astern. There are no delicate adjustments, and the atomizer and pumps can be adjusted while the engine is running.

The Southwark-Harris Engine will handle any grade of crude or fuel oil from 18° Beaume gravity up without preheating. Below 18° Beaume gravity, it is necessary to preheat the oil. Having no exhaust valves to pit or corrode when using oil having a high sulphur content, it is possible to use oils that could not be used by engines having valves. The fact also that governing is accomplished by changing the stroke of the fuel pumps to which the oil is delivered under pressure from the service tank instead of governing by delicate suction valves, and having the oil come by gravity to the suction valves, it is possible to use oils that many engines cannot use.

The line cut shows a 500 B. H. P. engine, two of which are to be installed in the "EDWARD SEWALL," owned by The Texas Company. In addition to the "EDWARD SEWALL," a few typical installations now being made of Southwark-Harris Engines are the

Pennsylvania Railroad, one 300 B. H. P. for a tug; Port of Seattle, Wash., one 225 B. H. P. for a ferry boat; Mr. Wm. G. Coxe, President of Harlen & Hollingsworth Corporation, one 150 B.H.P. engine for his private yacht; Fabius River Drainage District, two 300 B. H. P. engines to drive centrifugal pumps.

The Southwark-Harris Engine is particularly well adapted for drainage purposes, in that it may be operated at a speed most suitable to obtain the highest efficiency of the pump, depending upon the head of water.

The yacht "Southwark," 98x16x7 foot draft, in which is installed a 150 B. H. P. Southwark-Harris Engine, made the round trip from Philadelphia to New York, a distance of approximately 600 miles in 53 hours at a fuel cost of $8.20, and an expense of $1.84 for lubricating oil.

WHAT GOES ON INSIDE THE ROPE

A good surface on a wire rope is not always an indication of its strength. We have seen wire rope which appeared, when viewed externally, to be in good condition—but an examination after its failure showed a decayed hemp core, and corroded and broken inner strands. The rope was ruined by the action of the water—and not by the wear. The rope could have been saved by Texaco Crater Compound.

In the first place, the outer coating of TEXACO CRATER COMPOUND would have prevented the entrance of the mine water. Secondly, TEXACO CRATER COMPOUND permeates the core, and would have rendered it impervious to the destructive action of the tainted water.

Furthermore, TEXACO CRATER COMPOUND coats and lubricates the inner strands, prevents corrosion, checks the wear and cutting action of the wires upon themselves in moving under the load, or in bending around the sheaves and drums.

Remember this, besides its remarkable coating and penetrating powers. TEXACO CRATER COMPOUND is *pure lubricant throughout.* In fact, it is used for this purpose on gears and pinions, on roller bearings, and in numerous other places, under most difficult conditions of heat, pressure, or water.

TEXACO CRATER COMPOUND is impervious to saline or acid waters.

It resists heat, and does not stiffen and flake off when exposed to cold.

TEXACO CRATER COMPOUND is helping to make some remarkable hoisting records in coal mines throughout this country.

We must ask you not to confuse TEXACO CRATER COMPOUND with the ordinary "rope dressing." It is something entirely different—and in active service, so far superior that the only way to judge it is by a test.

We want to encourage such tests, and would like to send you enough TEXACO CRATER COMPOUND to coat a test rope. Write us for particulars.

We Haven't Begun to Tell the Whole Story of "CRATER"—

In some of our announcements in the last issue of Lubrication we explained how TEXACO CRATER COMPOUND saved gears. We took the gears of the Automatic Stoker as an example. We told you how "CRATER" stopped wear and abrasion—how it saved the gears—how it kept them true and preserved the efficiency of these chains.

Since these announcements, we have received some interesting letters from engineers, asking about the performance of **"Crater"** on other equipment. In answer we want to state these two facts unequivocally—

1—**Texaco Crater Compound** will save heavy duty gears of any size, cut, type or material.

2—**"Crater"** has shown itself to be the most efficient wire rope and cable preservative and lubricant ever discovered.

We have records of wire rope used under severest conditions, used under exposure to acid, water or blast furnace fumes, and these records include tests made against other products on the same sized rope and in the same work.

It has been shown conclusively that when a wire rope is laid up in Crater Compound and treated at intervals, that TEXACO CRATER COMPOUND **has doubled the life of the rope.**

There are numerous places where **"Crater"** will help on gears, on chains, on cables, on wire rope, on conveyors, hoists, on elevator guides, in mines, quarries, mills, on dredges, steam shovels, and other heavy equipment. **"Crater"** is a lubricant which resists heat, moisture, or chemicals. It cannot be squeezed out or flung off.

If you have any equipment of the sort giving you trouble, tell us.

Write us fully. We will tell you how **"Crater"** can be applied to relieve it.

THE TEXAS COMPANY

Houston - - New York

Distributing Points in Principal Cities

GOOD LUBRICATION AND ECONOMY ON A GAS ENGINE

We are pleased to print herewith a story of the performance of Texaco Alcaid Oil on a Gas Engine, as observed by one of our engineers in almost his own words:

"I called on the above mentioned plant this afternoon and met the Master Mechanic. He informed me that Texaco Alcaid Oil had been in use on their gas engines for some time, and that good results had been obtained from its use. However, I requested him to allow me to make an inspection of these engines in order to observe the oil and to check up the performance with the possibility of making further economies.

"These engines are twin cylinder, size 21"x24", 180 R. P. M.

"The cylinder lubrication is accomplished by means of a gravity oil cup placed on the crank end of the cylinders. The pistons are of the trunk type. These units are operating on natural gas, belt-driven to the jack-shaft, 200 H. P. on each unit.

"I noticed that all the cylinders were very satisfactorily lubricated, and if anything, there was an excessive amount of oil, but this oil on the cylinder walls is perfectly clean, and it doesn't show the slightest trace of carbon or gummy deposit.

"The Master Mechanic told me that he thought that Alcaid was the best cylinder oil he had ever used on this type of engine, and he backs this up by telling me that he has had eleven years of experience at this plant. He was quite enthusiastic and removed the spark plugs from both the cylinders of the No. 1 engine after an 8-day run, or actual running time of 96 hours. He showed this to me and pointed out that there was absolutely no trace of carbon on the spark plugs. He considered this an important improvement, for formerly he was obliged to clean the plugs every three days, and sometimes daily.

"The Master Mechanic also called my attention to the valve stem, which was badly scored from the use of the former gas engine oil. He told me that several engineers from the competitive oil company had recently visited their plant to investigate the complaint about the carbon formed by their oil, and that they had informed the Manager, that it was *impossible* to lubricate these gas engines, cylinders, and valve stems, unless a different cooling arrangement was installed. They actually advised circulating water through the pistons and valve stems which is not practical on this type of engine.

"The admission valves, which are of the Poppet type, are also equipped with a dash pot to facilitate closing. Formerly difficulties were experienced on the

valve stems, as the oil used prior to Texaco Alcaid Oil would cut the valve stems. I believe that we can cut down the consumption of the oil to the cylinders tomorrow, as the present feed is the same rate as when the former oil was used, and as I have said before, was excessive."

The next day our engineer returned to this plant and his report is substantially as follows:

"I spent the entire day at this plant and met the Manager, who accompanied the Master Mechanic and myself into the power plant. The Master Mechanic was glad to have me meet the Manager, for, as he said, we had been furnishing them the best oil he had ever used.

"After observing the engines for awhile, we were able to cut down the feed to the cylinders from 48 drops per minute to 40 drops per minute, and obtain a high degree of lubrication. This reduction showed that it was possible to use 20 per cent less of the Texaco Alcaid Oil than the former oil used, and still maintain a fine film of oil on the cylinder walls. However, this is not the minimum feed, as we believe that we can obtain a further reduction, but this reduction will have to be obtained by gradual stages, and the Master Mechanic agreed to cut down on the feed a little more each day until the minimum feed has been reached, following which a slight increase will guarantee thorough lubrication.

"From the performance of this engine and the excess of the Texaco Alcaid on the cylinder walls, I can assure a final result of about 50 per cent reduction in oil.

"The people at this plant are highly pleased. They realize that although the Alcaid Oil costs somewhat more than the competitive brand, the large saving will more than offset the difference in price. Furthermore, Alcaid has absolutely proven its economy by showing an increase of from 6 to 8 H. P. over former performances of the engine. In addition to this, all the carbonizing of the spark plugs, cylinder scoring, sticking valves, and all the former trouble has been eliminated. The Manager immediately placed a requisition for two barrels of Texaco Alcaid Oil, and I know that this is merely an opening, and I can see where The Texas Company will handle their entire business."

This report is an apt illustration of the only way to secure real economy.

These people, by changing to an oil which costs more per gallon, were able to save more per H. P., which is the only basis for measuring the value of fuel oil, or any other operating accessory.

You will notice that Texaco Alcaid Oil overcame a mechanical difficulty, and that it was not necessary to install a complex cooling system to take care of the trouble.

And added to this, was the saving on time, labor, and expense for removal of carbon deposits. Thus, the oil which, from a standpoint of expense, was an almost inconsiderable amount, will return a handsome profit in a year's operation.